

ORIGINAL

**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, D.C. 20554**

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In the Matter of )  
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Digital Audio Broadcasting Systems )  
And Their Impact on the Terrestrial Radio )  
Broadcast Service )  
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MM No. 99-325

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WASHINGTON, D.C. 20554

**COMMENTS OF VISTEON AUTOMOTIVE SYSTEMS**

**VISTEON AUTOMOTIVE SYSTEMS**

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## **SUMMARY**

Visteon Automotive Systems is one of the largest manufacturers of radios and entertainment systems for automobiles. Visteon supports the introduction of digital techniques to the aural broadcast services, but urges the Commission to adopt standards for a system that will meet the public's need for high-quality audio and ancillary data services with no loss of current service area or service quality. In order to be successful, the new digital audio broadcast ("DAB") systems must offer value for the additional costs that will be incurred by the broadcasters and by the public to implement the service.

In order to achieve this goal, the Commission should also include the use of new spectrum from the 82 - 88 MHz band (TV Channel 6) to enable prompt realization of the full benefits of DAB without interfering with existing analog stations. The TV Channel 6 solution may be employed in addition to, or in place of, an in-band, on-channel ("IBOC") system.

System coverage is important to the success of DAB. Implementation of DAB might be frustrated or delayed if the current radio geography is not maintained. The FCC should modify its evaluation criterion relating to coverage to require that DAB stations maintain the same coverage as the existing analog stations, recognizing the different technical characteristics of digital transmission and the improvements in analog receiver design that have extended the usable service areas. The predominant place that aural broadcast services are used is the automobile while driving. The driving public should not find service areas reduced under DAB.

The FCC is correct to consider the costs of implementation. Both IBOC and TV Channel 6 options will cost more than the present analog service, but not as much more as the cost of a completely new frequency band. A single tuner can bridge both TV Channel 6 and the adjacent

FM broadcast band. A DAB system requiring totally new spectrum, as was the case with EUREKA/147, would probably not be economically practical.

In addition to the evaluation criteria tentatively proposed by the FCC, the Commission should consider the effect of the new DAB on the diversity of programming available to the consumer. The listening public will demand more variety in programming in order to compensate for the additional cost of the radios. IBOC will not increase the number of radio channels available and might encourage the use of simulcast of analog service during the transition. Such a system would not seem to provide enough additional value to the listeners.

To the extent that the aural services are changed, the FCC and the broadcasters should initiate a program of consumer education to explain the benefits of DAB and prepare the public for an diminution in service area or quality that might result. The public will not adopt the new technology without education.

Finally, Visteon requests that the FCC establish a DAB advisory committee to enable the various private sector interests to work with the Commission's staff to reach consensus on as many issue as possible. The FCC will have to take an active role in this committee to ensure its success on as many topics as possible, and upon completion of this effort, the FCC will have to make the final decision on unresolved matters. The National Radio Systems Committee ("NRSC") has limited itself to the consideration of IBOC technology only and will not provide the FCC with much guidance on the relative merit of TV Channel 6. As such, it is too narrowly focused to provide all of the data that the FCC will need to make a reasoned decision and to select the best DAB alternative.

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**COMMENTS OF VISTEON AUTOMOTIVE SYSTEMS**

Visteon Automotive Systems hereby submits these comments in response to the Commission's Notice of Proposed Rule Making released herein November 1, 1999 (FCC 99-327) ("NPRM").<sup>1</sup>

Visteon is a major manufacturer of automotive electronics and systems and the second largest manufacturer of automobile radios in the world. Visteon places more than 6 million new radio receivers in automobiles each year. The automobile remains the principle place that audio broadcast services are used in the United States. Thus, to the extent that the driving public can be convinced a new digital audio broadcasting ("DAB") system offers value to the consumer, Visteon will be a major supplier of the new receivers that will foster the growth and acceptance of this new technology. Thus, Visteon urges the FCC to adopt regulations and standards to implement the best possible DAB system, one that fulfills its promise to be a significant improvement over present aural broadcast services at reasonable cost to the listeners.

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<sup>1</sup> 64 Fed. Reg. 61054 (Nov. 9, 1999).

In order that the promise of DAB may be achieved, the FCC should not limit its technical evaluation to the two currently proposed in-band, on-channel (“IBOC”) systems,<sup>2</sup> but should also include use of additional spectrum in the band 82-88 MHz (TV Channel 6) exclusively for DAB. Such a provision would permit early demonstration of the benefits of DAB and allow for an orderly transition of the existing analog FM stations to the new digital technology. The full benefits of DAB and the ancillary services that can be offered to the mobile public would be available from the outset and need not await full implementation of DAB throughout the band. The Commission should also adopt technical standards for DAB that are based on digital technology rather than continuing the existing protection criteria based on analog systems. The Rules should also ensure that the DAB “geography” is at least as large as the actual useable service contours of the existing analog stations and is not limited to the predicted contours of these stations. Moreover, in order to encourage early adoption of DAB by the public, the FCC should adopt rules and a technical solution that will promote an increase in the diversity of programming available in the AM and FM bands with implementation of DAB. Finally, the FCC and broadcast industry should launch a public information campaign with the rollout of the new DAB service so that the public understands the benefits and limitations of the new services.

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<sup>2</sup> The two actively proposed systems are those of USA Digital Radio, Inc. (“USADR”) and Lucent Technologies, Inc. The current status of the third system, Digital Radio Express, Inc. (“DRE”), is unknown at this time.

**I. The TV Channel 6 Option Should Be Considered Along With, or in Addition to, the Candidate IBOC Systems**

The Commission has tentatively proposed evaluation of candidate IBOC systems to determine which DAB system best meets the selection criteria to be adopted in this rulemaking.<sup>3</sup> With little additional effort, the TV Channel 6 option can be considered further against the same set of criteria. The new spectrum made available in TV Channel 6 could be populated exclusively with the all-digital end-system design of one of the IBOC systems, without the requirement for an extended transition period accommodating dual-mode services, or the new spectrum could be populated by a system designed to be digital from the start. Use of TV Channel 6 would permit the public to realize the benefits of full-power all-digital service as soon as the DAB stations begin to operate in the new spectrum. This early demonstration to listeners of the benefits of DAB, together with the increase in the number of stations available with a TV Channel 6 DAB, would encourage people to acquire digital receivers.

The only potential drawback to the use of Channel 6 is the fact that this spectrum might not be available in all markets in 2007 if transition to digital television (“DTV”) is delayed.<sup>4</sup> The potential drawbacks to a reliance solely on IBOC are possible lower quality of service, reduced coverage, and deferral of some of the benefits of DAB until after the analog systems are removed from the band.<sup>5</sup> IBOC may also cause adjacent channel interference to existing analog stations

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<sup>3</sup> See NPRM ¶ 37.

<sup>4</sup> See Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251, § 3003, codified at 47 U.S.C. § 309(j)(14)(B).

<sup>5</sup> Full-power digital operation and the ancillary data services cannot be provided while IBOC systems are operating in the hybrid mode supporting both digital and analog service.

during the conversion, which would further degrade the perceived value of AM and FM broadcast service by the public. Finally, the IBOC systems under consideration might not promote, and could actually prevent, the increase in the diversity of programs choices necessary to attain public acceptance of the DAB and its additional cost.

Where the Commission may find divergence between the IBOC systems, on the one hand, and DAB using TV Channel 6, on the other hand, is in overall quality of service and schedule. As the FCC has recognized, IBOC systems can cause adjacent channel interference to analog stations during the transition and result in loss of actual coverage for existing stations.<sup>6</sup> Modern receivers dynamically change their internal operating parameters (mono/stereo blending, diversity antenna switching) based on high-frequency noise measurements of the recovered baseband signal. With the addition of an increased power density between 100-200 kHz from an IBOC FM DAB signal, there exists the real potential that this additional signal will cause undesired, and still unknown, performance changes to existing analog receivers.

To some extent, the experience with AM stereo is instructive in this regard. AM stereo suffered from the lack of a standard, which unnecessarily increased the cost of implementation and created confusion in the marketplace, but it also suffered from an increase in the susceptibility of the AM stereo signals to interference. The public having been led to believe that AM stereo would be an improvement, found the enhancement in listening pleasure less than expected and, in a number of cases, found the service less satisfactory than monaural AM.

Further, the use of analog protection criteria for the new DAB may result in less actual coverage for the new DAB than the current analog stations. Changing the radio “geography” that

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<sup>6</sup> See NPRM ¶¶ 8, 22, 24.



the public has grown to expect would discourage use of DAB. Finally, the full benefits of DAB using IBOC might be deferred until the completion of the transition to all-digital operation in the AM and FM bands, a date that will, in all probability, be a decade or more later than the date upon which TV Channel 6 becomes available in some markets.

The TV Channel 6 solution, by providing new spectrum immediately adjacent to the current FM broadcast band, would provide a superior technical system and make for an easier transition. The concern expressed by the FCC, however, is one of schedule. TV Channel 6 will be available once the transition to HDTV is completed. Only one HDTV channel assignment involved Channel 6 and that undoubtedly can be changed.<sup>7</sup> The problem is that the HDTV transition, which is currently scheduled to be completed by December 31, 2006, may be extended under provisions of the Balanced Budget Act of 1997 in some markets.<sup>8</sup> On the other hand, the full benefits of IBOC systems might not be realized until all analog audio broadcasting ceases, and full power can be applied to the digital signal. IBOC, without additional spectrum, also will not increase the number of stations available.

The FCC will have to develop an assignment table for the additional frequencies made available for DAB in the band 82-88 MHz. A DAB advisory committee discussed below can address the development of a DAB table of allotments for Channel 6.

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<sup>7</sup> Only one city (New Haven) is assigned Channel 6 in the DTV Table of Allotments, and the Commission will be able to accommodate New Haven with a different DTV assignment. Currently, there are 57 analog TV assignments on Channel 6. *See* NPRM ¶ 44 n.92.

<sup>8</sup> *See* 47 U.S.C. § 309(j)(14)(B).

## **II. Criteria for Selection of DAB System**

The FCC has proposed ten criteria for selecting the DAB system. Visteon agrees that the FCC should adopt a standard for DAB and not leave the selection to market forces. Visteon agrees with most of the criteria as stated in the Commission's Notice, but would alter the criterion relating to coverage and would add a criterion relating to promotion of diversity of program content. The criterion of receiver cost is also important and would support a TV Channel 6 solution as well as, or in addition to, IBOC.

### **A. Coverage**

The FCC proposes to protect the new DAB and the existing stations based on analog technical standards and the current predicted contours.<sup>9</sup> As the Commission recognizes, improvements in receiver sensitivity have extended the range of analog FM broadcast service beyond the normally predicted contour of the station. As one moves beyond this contour, the signal to noise ratio (C/N) decreases, the service quality declines, the receiver may shift to monaural mode, and under some propagation conditions service might briefly drop out, but the driving public has come to rely upon this extended area of service.

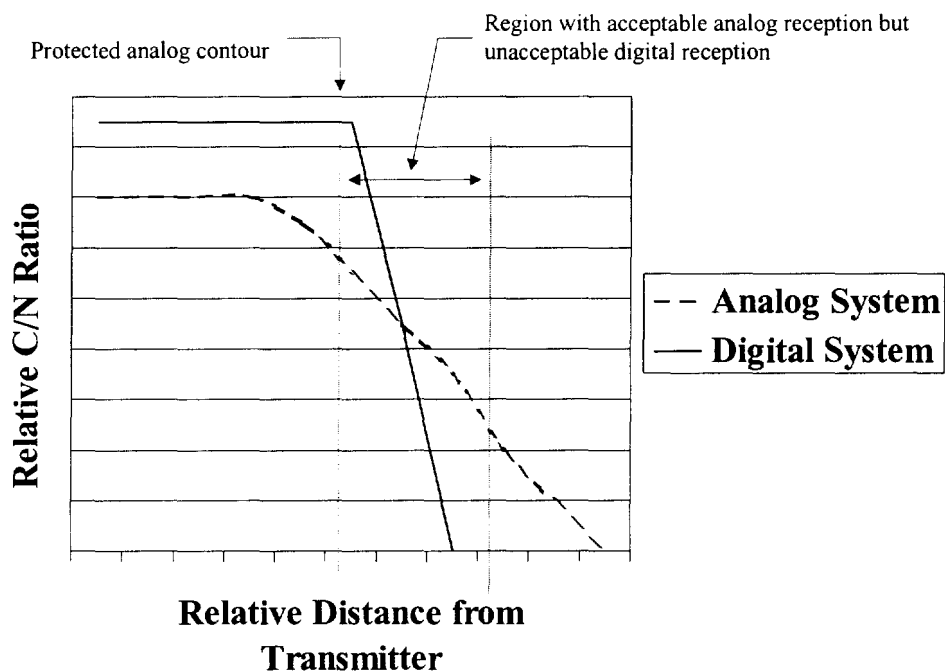
The loss of the service from an analog station due to interference from a DAB station during transition would not serve the public interest and might lead the listener to conclude that his receiver was defective. Complaints about service area and signal quality will not go to the broadcasters; rather, the public will complain to their dealers, and these complaints will ultimately be laid at the feet of Visteon and other radio manufacturers. If the service areas

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<sup>9</sup> NPRM ¶ 33.

decrease as a result of DAB, the public will lose its incentive to purchase the new radios and will abandon the service.

Digital broadcast also has different technical characteristics and the Commission should adopt protection criteria suitable for the DAB that it selects as the standard. In establishing these standards, the FCC should attempt, to the extent practical, to match the coverage currently provided by the analog broadcast stations. The digital signal is more robust than the analog, but at the edge of coverage, it drops off much more rapidly with than does an analog FM signal. This effect can be portrayed parametrically as follows:



Thus, the FCC should adopt assignment criteria that will maintain parity of effective coverage between DAB and the actual analog FM geography.

## **B. Program Diversity**

Critical to public acceptance of DAB with its attendant higher costs is additional value. For the audiophile, the additional fidelity may be sufficient, but for most consumers, additional program choice will be very important. For this reason, the FCC should add an evaluation criterion relating to programming diversity. Additional program content may well be the “make or break” issue for widespread adoption of the new service by listeners.

Both of the candidate IBOC systems would simply add DAB to existing AM and FM license. This would not, in itself, promote diversity in programming. An IBOC system would not encourage the licensee to transmit different programming in the digital channel than is being transmitted on the analog station. Indeed, the USADR system might not even permit operation except in a simulcast analog/digital mode. Even when the IBOC transition is complete, there would be no additional content to compensate for the consumer’s investment in a digital receiver.

DAB will be competing with two satellite digital audio radio systems (“SDARS”) – Sirius and XM Radio – each of which promise 100 channels of digital-quality programming for about \$10 per month. DAB will have to add content in order to offer value to the consumer.

Adding the 6 MHz from TV Channel 6 to the FM band would permit additional program choices from a relatively early date. These new channels can be assigned to existing broadcasters, to new entrants, and/or to educational entities, but in order to maximize consumer choice, a rule limiting same-market simulcast should be adopted.

**C. Implementation Costs/Affordability of Transmission and Receiver Equipment**

Visteon agrees that receiver cost is an important consideration. The widespread use of radio in the United States is due in significant part to inexpensive radios. The greater the additional cost, the more value that the consumers will demand in order to make the shift.

We can learn from the experience of Europe and Canada in implementation of the EUREKA/147 DAB system. This system has yet to enjoy widespread market acceptance because of the increased cost of the receivers is not balanced against programming or service gains. Although EUREKA/147 uses separate spectrum, to date, much of the program content consists of simulcast of existing programming. EUREKA/147 only offers improved audio quality. The market seems to saying that EUREKA/147 offers too little or EUREKA/147 cost too much.

EUREKA/147 receivers cost several hundred dollars more than conventional receivers because of the need to accommodate an additional tuner for the L-Band or VHF Band III, the additional digital decoding circuitry, and a different antenna. In exchange for this investment, the consumer has been given only minimal new program material or content. Instead, the consumer has been given somewhat better quality versions of the existing programming by simulcast of analog programs. In short, the system has offered little incentive to the consumer to make the additional investment.

Cost of the receiver is an important consideration in selecting a DAB for the United States. Both the Channel 6 and IBOC solutions will cost less than EUREKA/147. Both IBOC and Channel 6 will require the same fundamental building blocks for decoding the digital signals, such as analog/digital converters, digital demodulators, de-interleaving circuitry, audio decoders,

clock circuitry, and control circuitry. Both would use the current FM antennas and neither would need a separate tuner, although both would require some modifications to the current analog tuners. Both Channel 6 and IBOC should thus cost less than EUREKA/147, but more than current AM/FM analog radios. If TV Channel 6 is added to the DAB/FM band, some small additional cost over the IBOC receiver may be needed in order to expand the range of the tuner to cover the entire band 82-108 MHz.

### **III. The FCC and Broadcasters Should Develop a Public Information Campaign to Educate Consumers About the Changes in Their Analog Reception**

With the results of the study by the National Radio Systems Committee ("NRSC") and the conclusion of this Rulemaking, the FCC will establish a new radio "geography." Visteon hopes that the service areas for DAB will not be smaller than the current analog contours and that overall service quality will improve from the beginning. If, however, consumers are presented with a change in the quality of the reception they are accustomed to receiving or familiar stations are no longer listenable, they will need to be educated about the reasons for the changes. They may not understand that the change is due to a new broadcasting technology. Moreover, because reception problems may affect most stations, most consumers will assume the problems they are experiencing lie with their receiver. As a manufacturer of receivers, this problem is important to Visteon. The broadcaster should also be concerned because public disappointment with performance may result in abandonment of aural broadcast services by listeners in favor of SDARS or CD-players.

If an IBOC DAB system is implemented without consumer education as to the changes in the coverage and performance of DAB as well as the benefits of the new service, the roll-out of the new service could be slowed. If consumer expectations about the new technology are not

met, the market penetration of DAB will be hurt, resulting in an extended and uncertain transition. The resulting confusion and disappointment by the public would impose cost on the industry would drain away the resources needed for implementation of the new system. Absent a consumer education program, for example, radio manufacturers and distributors could face warranty calls, consumer complaints, and general dissatisfaction with the performance of the DAB receivers.

Thus, the Commission and the broadcasters should implement an educational program in conjunction with adoption of a DAB standard that changes the nature of analog signal reception. Such a program would explain to consumers the changes they are experiencing. For example, they will need to understand why their analog reception will not be as robust as it once was and that, initially, digital broadcasting service areas might not equal those of the older analog technology until the technology is fully implemented.

The consumer awareness campaign should be maintained over an extended period of time, because the transition will take a decade or more and the difference in reception might not be noticed until a new product is purchased. The Commission is no stranger to a prolonged educational effort of this type. The Commission has undertaken to provide regular consumer bulletins on the state of the transition to DTV.

#### **IV. The FCC Should Establish a Federal Advisory Committee to Recommend Standards for DAB**

The NRSC is currently evaluating the two IBOC proposals and will issue a technical report. The NRSC actively will provide valuable information to assist in the development of rules for DAB, but it is currently restricted to the evaluation of IBOC alternatives. This body is not considering new spectrum at all. The NRSC report and the DAB systems (including the use

of TV Channel 6) should be reviewed by a government/industry federal advisory committee established in conformity with the Federal Advisory Committee Act ("FACA").<sup>10</sup> This DAB advisory committee would consist of system proponents, broadcasters, manufacturers, and representatives of the listening public. Visteon will participate in such a forum.

A DAB advisory committee will be better able than the NRSC to delve into the economic, market, and service questions and tradeoffs raised by DAB than the NRSC which is more focused in the technical aspects of the systems. The DAB advisory committee should be given a firm, and relatively tight, schedule to develop recommendations to the FCC as to the selection of a DAB and technical assignment criteria for the selected system. While it is probable that such a committee would not achieve consensus on all issues, the very process will clarify the policy choices that the Commission needs to make.

In order for a DAB advisory committee to be effective, the FCC will have to take an active role as facilitator and mediator so that as much as possible can be accomplished by consensus. After the DAB committee has completed its work, the FCC will then establish the standards for DAB in the United States and resolve outstanding questions.

The end-product of this effort should be for the Commission to select a standard for DAB. The experience with AM stereo demonstrates the need for a single system standard. The additional software and hardware to support multiple DAB systems would increase the cost of the service to the consumer without concomitant benefit, which will discourage purchase of DAB-capable receivers. If few people buy receivers, DAB will not succeed.

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<sup>10</sup> 5 U.S.C. App. 2 (1996).



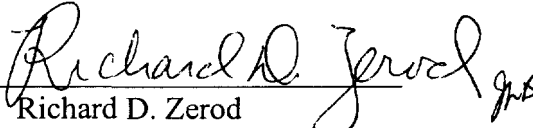
## V. Conclusions

Visteon fully supports the Commission's efforts to implement digital technologies in the aural broadcast services. The selection of a DAB for the AM and FM radio services must be done carefully so as to ensure that the public perceives and receives the benefits of DAB, and that the transition to DAB not result in diminution of broadcast radio services currently enjoyed. To this end, Visteon urges the Commission to consider the use of TV Channel 6 along with the IBOC systems to implement DAB. In order that service to the public not be lost, the Commission should use actual service contours of current stations rather than the more limited predicted contours and use technical standards for assignments based on the digital system actually adopted. The benefits of DAB (together with any shortcomings) should be carefully and continuously explained to the public over the transition period. Finally, the Commission should establish a DAB advisory committee to assist it in assembling the facts and policy questions necessary for the agency to make the best decision possible.

Respectfully submitted,

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